An Innovative Approach on Vertical Farming Techniques

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Abstract— The Vertical Farming is the advanced level of agriculture technology where this has to be practiced when there is unavailable of land and other requirements for the perfect structure of farming mode, this is the new way or approach in the advanced level and this paper deals the methodology, harvesting technique, water management and crop cultivation & yielding process. And some of natural renewable resources are used such as windmill, solar etc, where these are not similar to the normal agricultural process, some of the other practices have to be for the good yielding process.

Keywords: Vertical Farming, Renewable Resources, Windmill and Solar Energy.

I.INTRODUCTION:

Vertical Farming is the process, which is the combination of skyscraper or greenhouse effect together to form the advanced level of agriculture practices; this vertical farming technology is used to cultivate crops through the artificial sunlight or through may be the direct sunlight process. Green house effect is the harmful to the earth environment so this system minimize the green house effect partially and it is composed by the natural manner, most of the vertical farming are not build with the eco-friendly appearance. But this vertical farming has the less made of glass which can pass the oxygen to the outer layer of the farming areas. Different kinds of water system & management are followed in the vertical farming system.

The resources used in this vertical farming system where the windmill is used generate electricity for the water pumping system, also these windmills are kept at the top of the skyscraper where to gather air source and other energy resources are added additionally such as solar energy for the purpose of generating the artificial light source to the crops for the high yielding. The vertical farming requires the water harvesting, hydroponics technique, fade type of glasses and suitable architecture structure to the vertical farming in the way of designing potentially.

II.FARMING ARCHITECTURE:

The vertical farming architecture is categorized into various sections that there are

energy management, water management it also known as hydroponics, cropping method and harvesting manner etc. The vertical farming architecture is also depended on the construction oriented process, where it takes the complex situation some times that there enough sunlight radiation has to pass on all crops of the plants for the healthy growth.

A. Renewable Resources:

Vertical Farming system is designed for the future purposes where the sources such as electricity, low level of water availability are may or may not be occurred in the future days. So in the way of handling those situations the system involved with the renewable resourcing process, where the wind mill can be used to generate electricity for the water pump process for supplying water to the crops, and solar energy are also added additionally to generate power for the producing of artificial sunlight to the crops.

B. Reaping Process:

The reaping process also known as water management process, thus especially the water is going to be managed in the vertical farming structure. Where some of the methods are going to be discussed such as rain water harvesting method, this method explains that water which are collected for the rain are too passed through pipes to crops, so by getting of the rain water through indirect process will get an healthy and natural yielding, these activities are done through the hydroponic system it is stated as the nutrient content are going to be passed on the crops through the pipes, while flowing of water to the crops regularly the mineral is also to be added in the water.



1. Hydroponics Progress

C. Working of Hydroponics:

Hydroponics methodology is the important process of the vertical farming system, where this has to be constructed with the excelling as the crops are planted with the soil with the connection of the pipeline these pipeline connection will require the injector to pull the force of the water and it consists of sufficient power generation.

And filter also available in the hydroponics system to remove the wastages in the water and it is built with the mixture that the minerals are kept in the separate storage whenever the need of bug killer minerals also can be mixed with the water to protect the crop from the insects which destroys the crops entirely, so hydroponic is done in the multiple ways to grow crops.

III.ASSETS OF VERTICAL FARMING:

There are many assets are in the vertical farming technology where one of the most benefit is reliable cropping, there is no any seasonal cropping is not needed as the every process of the system are done with the interior process so the crops can harvest at any season in interior farming, by applying of this technique there will be no crop loss occurred and also other benefit of interior framing are stated as no bugs can infect crops and climatic changes are also not affect the crops. Energy is less utilized in the vertical farming system where led lights are used instead of the sunlight for the growing of crops better than under the sunlight.



2. Artificial lighting for Crops

Also this system reduces the labour cost where like the agriculture field work only more number of labours and our system requires only less manpower. As the less amount water is enough for the vertical farming technology. While if the land based agriculture it requires more of water in order cover all the crops of the land, but the vertical farming a separate faucet is linked individually to every crops of the system.

IV.ECOFRIENDLY METHODOLOGY:

As the vertical farming system has the various methodologies it is the eco-friendly process, as we can able to cultivate any kind of crops at any duration process, multiple-crops can be cultivated in this process and if the heavy rain came it can be able to damage all crops of the system but in this system the crops are protected under the buildings so the plant or crops cannot be affected through rain. The water used in this system which can be used again by the recycling process is stated as the water are passed over hydroponics system and the excess amount of water is collected and made into the recycling process.

It's a fully eco-friendly technique where new kind of crops can also be developed easily in the vertical farming system. And the plants or crops which are grown under vertical farming are free from pesticides and it makes the healthy food when it is compared to the land farming system. This kind of technique is fully get successful on the urban areas to move the green environment.



3. Vertical Farming Model

A. Waste Reduction:

The waste reduction is the one of the benefit of the vertical farming technique where in case of land farming the crops or plants get damaged due to heavy rain and pesticides, where in case of the vertical farming the waste is reduced by the interior agriculture methods, and energy for the vertical farming are usually managed with the solar and wind power so that the energy utilized are renewable sources and vehicular transportation also the important phase of the vertical farming where transportation costs are reduced.

B. Increased Growing Area:

Now a day's there is increment of vertical farming and green houses are developed where it is fully build with the hydroponic and renewable resource based, which completely created with the advanced management, where green house are not fit for the earth environment but the combined of vertical farming and green house where carbon dioxide are passed over the outer location of the building. By applying of vertical farming there will be the maximum crop vielding, make the temperature controlled manner.



4. Interior Farming System

V.INTEGRATED TECHNOLOGY:

The integrated technology is one of the most advancement in the vertical farming technique where the system has to be completely controlled with the computers and other embedded systems such as sensors etc, but in our system the integrated system which has to be to analyse water, air and mineral maintenance. While if take the air quality management the crops and plants are needed the Carbon dioxide and this supplied by the air management integration system, as plants has to develop in the health manner a separated separate system has to be created as well as the water and air quality also managed.



5. Integrated System for Farming

VI.CONCLUSION:

Thus the paper completely discuss about the vertical farming structure, where it has to be completely made off with advanced technology such as artificial lighting system, hydroponic system and efficient farming management in the urban areas. By collecting of all these qualities the vertical farming may developed in the well organized and it gains the high amount yielding in the agriculture.

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